**Part A: Notes to Students**



Attention Future Engineers;

The City of Toronto has just received a generous donation from DYNEX Corporation to finance the construction of a new bridge within the GTA. We are very excited to begin accepting proposals, prototypes, and sketches for this new structure!

It has come to our attention that your group of engineers is at the forefront of modern design and we are extending this opportunity to you exclusively!

Please be advised that DYNEX has made certain requests that must be filled in the construction of the prototype that you will present, and they are as follows:

The prototype should be:

1. No **longer** than 50cm
2. No **higher** than 30cm
3. No **wider** than 15cm

There are several considerations that you must make when building the prototype and these must be answered clearly in your proposal:

1. How does the design link the structure to its function?
2. What are the major forces that your structure will encounter?
3. How will your design ensure that your structure can withstand these forces? (Address each force individually)
4. Justify the materials you would use in the construction of your bridge.
5. How will you dispose of extra materials or scrap materials during and after construction? What effect might this have on the environment and society? (Please consider the most environmentally-friendly methods)
6. Based on the materials and structure used, what is the predicted lifespan of your structure and what is the maximum load that it will be able to support?
7. Address potential need for maintenance and how will you finance this maintenance (i.e. will there be a toll or tax on your bridge)?
8. Select a location for your bridge. Justify this location by addressing: members and needs of the community, impact on wildlife, and potential economic gains.

It will be required that you demonstrate evidence of scientific testing of your structure, and provide conversions of these results to the real life structure.

We look forward to seeing your prototypes, proposals, and sketches!

Kind Regards,

City of Toronto Structures and Buildings Committee

Over the course of the next few weeks, we will be working as a class to learn all the information necessary in order to successfully complete the request of the DYNEX Corporation (as outlined in the letter).

**In** **groups of 3-4** you will be researching, designing, sketching, and building your proposed structures. In addition, you will be drafting and composing a design proposal for the City of Toronto and DYNEX Corporation to review prior to reviewing your model.

Remember: As you progress through the various phases of this project, the requirements as outlined in the letter from the City of Toronto and DYNEX Corporation must be followed when construction of your model begins.

The timeline of events for this project will be as follows:

**Week 1:**

-Groups will be assigned  
-The class will visit the library and computer lab to locate primary and secondary sources  
-Groups will brainstorm and assign questions that each group member will need to research and answer  
-Groups will brainstorm the most appropriate design for their bridge, based on research findings about:

-safety of each bridge design studied  
-communities within the GTA who will benefit from the bridge  
-environmental impact of building in each area  
-waste-management options  
-potential problems  
-financing for the bridge, etc.

**Week 2:**

-Groups will wrap up any remaining research   
-Groups will complete and hand-in the research graphic organizers  
-Groups will begin designing their bridge  
-Groups will bring in appropriate materials for the construction of their bridge

**Week 3:**

-Groups will receive feedback from their research graphic organizers  
-Providing their research has been approved by the teacher; groups will begin building their bridges

**Week 4:**

-Groups will have some catch-up time (if necessary) to complete the construction of their bridge  
-Groups will ensure that drafts of the write up are complete and each group member has a completed copy  
-Groups will receive some extra computer lab time to complete the final copy of their report

**\*\*Throughout this 4 week period, groups are expected to work through the template/rough copy for their proposal – many elements of this draft can and must be completed during the design/build process\*\***

**May 25, 2011:**

-Final draft of the project will be submitted along with the self assessment, peer assessment, and all graphic organizers/templates

**Final Mark Breakdown:**

20 marks = Evidence of research

10 marks = Successful completion of all graphic organizers/templates

30 marks = Good copy of written report and sketch/diagram

30 marks = Successfully completed prototype of bridge

10 marks = Completed Self and Peer Evaluations

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**100 marks = Total**